

MODELLING A HIERARCHY OF CONSUMER DECISION STATES: THE CHOICE OF ISLAND HOLIDAY DESTINATIONS AND DVD PLAYERS

Jordan Louviere and David S. Waller
University of Technology

Murray D. Smith
The University of Sydney

Track: Conceptual Papers / Marketing Theory

The authors gratefully acknowledge a UTS Internal Research Grant that supported primary data collection.

Abstract

The purpose of this paper is to discuss a conceptual framework for a hierarchical model of consumer decision states, and some preliminary empirical evidence. A pilot study measured attitudes towards choices of island holiday destinations and DVD players using a random sample of AMR Interactive On-Line Panel members. Descriptive and modelling results indicate overall support for the conceptual framework.

Introduction

For decades scholars in marketing and related fields have proposed that brand and product choices observed in consumer markets are the result of a series of decision stages or a hierarchical system of decision states (eg, Nicosia 1966; Howard and Sheth 1969; Engel, Blackwell and Kollat 1978; Louviere 1981). Indeed, the literature suggests that there are a series of stylised states through which most consumers progress from awareness of new product categories and/or category offerings to purchase decisions. These states include:

1. **awareness** that a category/class of choice options exists and can be chosen (eg, island holidays or DVD players) and/or awareness that particular brands or forms of such products (eg, Sony or LG DVD players, Lindeman Island, Brampton island, etc) exist within a category;
2. **attitude/interest formation** in choice options by learning/acquiring information about their pros and cons (more generally, features or "attributes") leading to some level of interest (or disinterest) in a category/class and/or brands or forms based on information learned and impressions formed;
3. **capability of acting** on awareness and interest (eg, can one afford to purchase? are there restrictions that preclude choice like allergies, lack of access, etc?), otherwise known as constraints on choice;
4. **deciding whether to choose now, delay or never choose** if aware, interested and capable of acting; and
5. **deciding which one or more options to choose** if deciding to choose now.

The literature implies that such states and the factors associated with membership in them are important to fully understand consumer choice behaviour. However, we find little recognition in the literature that in real markets at any moment in time consumers are distributed in such states. For example, in new markets most consumers should be in the earliest states like "pre-awareness", but in more mature categories proportionally more consumers should be in later states like repeat purchase. Much consumer decision-making research has focused on decisions 4 and 5 above, such as brand choice (eg, Louviere, Hensher and Swait 2000), but

the framework suggests that there are a series of conditional probability states, which, if true, has implications for a variety of inferences derived from analyses of later states. For example, price elasticities estimated from brand choices in scanner panel data are conditional on previous states, and price can play a role in consumers being in each of the prior states as well as later brand choice states.

Many papers propose/suggest various frameworks for such states, such as those dealing with a hierarchy of effects, but only a few papers actually examine distributions (eg, Kardes, Kalyanaram, Chandrashekar and Dornoff 1993, and Kalyanam and Putler 1997). Moreover, we could not find publications that proposed and tested a logically and consistently integrated model or model framework for all decision stages or their logical antecedents. This gap is surprising because individual and household decisions/choices are the basic building blocks of aggregate demand. Thus, the overall objective of our research is to contribute to understanding consumer decision-making and choice processes and the stages through which consumers progress to make final purchase decisions. A specific objective is to test the usefulness and adequacy of the conceptual framework that follows.

Conceptual Framework and Research Approach

The conceptual and modelling framework underlying our research is illustrated by Figure 1, which posits a series of conditional states leading from consumer awareness of need(s) or want(s) to interest and capability of choosing, to ultimate choices of brands, purchase volumes and timing. The processes implied in Figure 1 ignores potentially complex micro-level processes that may underlie consumer behaviour, but it does allow us to develop models and test hypotheses of major components (Louviere and Waller 2003).

Models of the processes implied by Figure 1 can be developed using Random Utility Theory (RUT), such as a system of logically consistent nested logit models of the type suggested by Small (1987). RUT posits that individual preferences are inherently unobservable, but can be decomposed into two components: (1) a systematic/explainable component, and (2) a random/unexplainable component. Given assumptions about the distribution and properties of the random component, one can formulate and test models of the explainable component. However, the preferences of a population of individuals can never be fully explained because one cannot directly observe the process. Thus, individual preferences are inherently probabilistic, and models that explain consumer preferences and choices (choice models) are families of probability models derived from assumptions about random components of preferences. Hence, the implied relationships in flow-charts and causal diagrams proposed by previous researchers (eg, Howard and Sheth 1969 and Engel, Kollat and Blackwell 1978) are inherently stochastic. Two papers recognise that these processes are stochastic (Kardes, Kalyanaram, Chandrashekar and Dornoff 1993; Kalyanam and Putler 1997), but both proposed and examined a narrower and more restrictive framework than what we propose. Also, Roberts and Lattin (1991) modeled consideration set formation, which although staged, is less detailed than our proposal.

Indeed, the distributions of consumers in states at a point in time should differ by product/service category and/or brands; and category involvement levels and lengths of time categories and/or brands have been in a market should impact these distributions. For example, complexity and risk should affect distributions of decision states by making it easier/harder for consumers to transit between states. So, more consumers should transit to final decision stages for low involvement categories, and fewer in high involvement categories. Also, the longer a category has been in a market, the more consumers should be in

later decision stages, all else equal, and so more consumers should be in early decision stages for new categories than mature ones. This paper presents and discusses results from a preliminary study of two categories: island holiday destinations and DVD players. Funds from the ARC have been sought to support further research.

Research Methodology

To implement our framework and test the hypotheses, a pilot study/survey was developed to study choices of island holiday destinations, and of DVD players. The pilot involved a convenience sample of students and others who responded to a survey that measured the constructs of awareness, interest, capability and choice, and obtained basic demographic data on gender, age, education, household size, etc. The pilot sample was implemented as a class assignment in the subject Introductory Marketing Research at UTS and resulted in 532 completed surveys. Experience with the pilot survey and results were used to revise the survey, and the revised survey was administered to a random sample of the AMR Interactive On-Line Panel that resulted in approximately 1200 complete and usable responses (completions differ slightly for islands and DVDs). A copy of the survey is available from the authors on request.

Results

Responses to questions designed to measure the key decision states constructs were transformed to binary indicator variables that equal one if a respondent agrees that a particular category or brand possesses a construct/feature and equal minus one if a respondent disagrees. Results were first cross-tabulated to determine if the constructs of awareness, interest and capability were related to actual choices in the way which were anticipated: few subjects should choose or have chosen if they are unaware, have low interest or have less capability of acting; similarly, more subjects should choose or have chosen if they are aware, have high interest and are more capable of acting. The crosstabular results appear to bear out these expectations, and so we proceeded to estimate preliminary binary logistic regression models to test the significance and signs of the constructs in explaining category choices.

Table 1 contains the results of two binary logit models fit to the binary states of (1) having visited any island holiday destinations in the past three years, and (2) choosing an island destination as most recent choice. Both states were relative to not visiting or choosing. Table 2 contains similar results for DVD players.

Tables 1a and 1b indicate that the probability of choosing relative to not choosing an island holiday is positively related to having heard about options in the category (measures number of islands heard about), having also heard good things about options in the category (measures number of islands good things were heard about), and knowing enough about each option to decide now (measures number of islands they know enough about to decide). The number of options of interest is positively related to previous visits, but not to most recent visits. Positive capability of being able to take an island holiday (can afford, have time, etc) is marginally positively related to choice. Non-capability of taking an island holiday (physical limitations, health, family obligations, etc) is not significantly related to choice, but at least has the correct sign. The binary logit models fit well by conventional standards, and the overall models are highly significant.

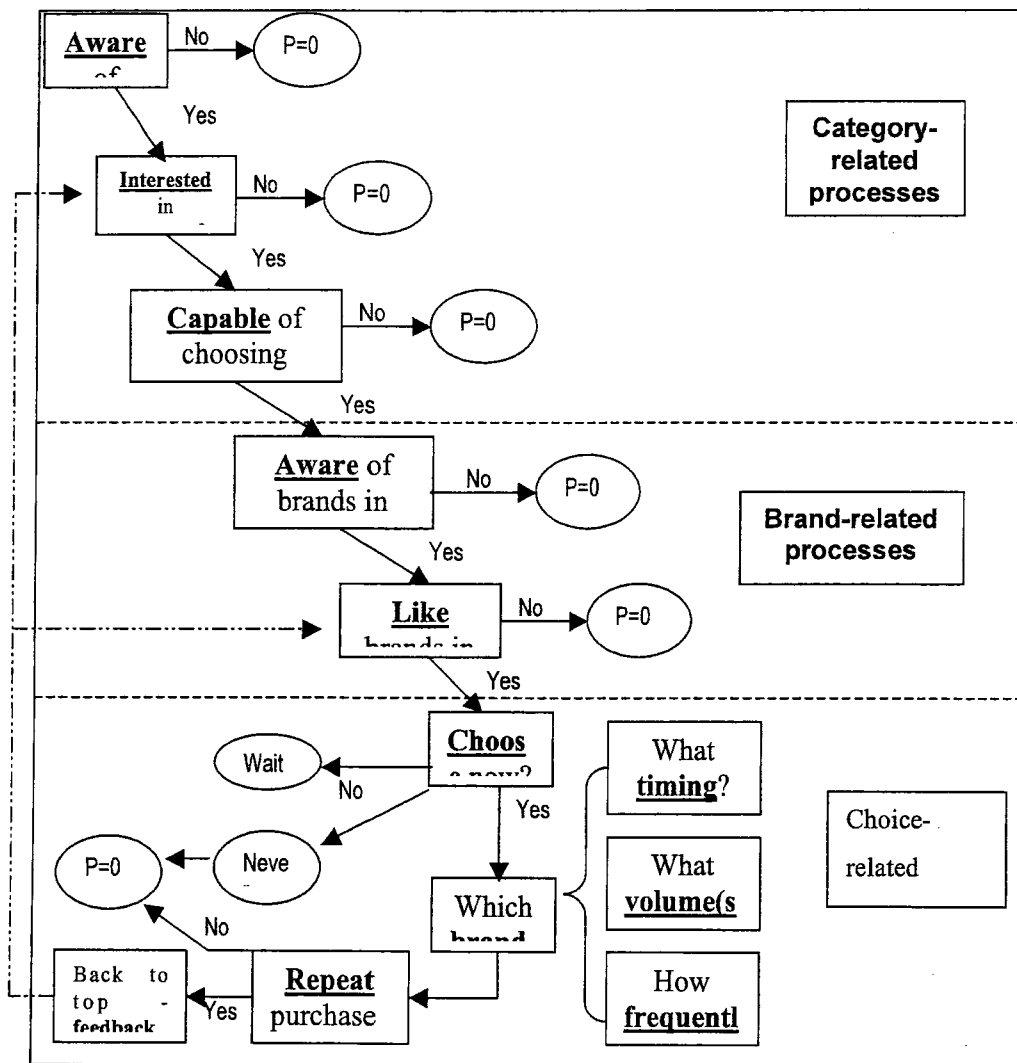
Tables 2a and 2b indicate that the probability of having used relative to not having used a DVD player is positively related to having heard about options in the category (measures number of DVD brands heard about), having also heard good things about options in the

category (measures number of DVD brands good things were heard about), and knowing enough about each option to decide now (measures number of brands they know enough about to decide). The number of brands one is interested in is positively related to considering a DVD, but not to having used one. Capability of using a DVD (can program, can afford, have space, etc) is positively related to having used a DVD, but unrelated to considering purchase of one. The binary logit models fit well by conventional standards, and the overall models are highly significant.

References

- Engel, James F., Roger D. Blackwell, and David T. Kollat (1978), *Consumer Behavior*, 3rd. ed., Hinsdale, IL: The Dryden Press.
- Howard, John A. and Jagdish N. Sheth (1969), *The Theory of Buyer Behavior*, New York: John Wiley & Sons, Inc.
- Kalyanam, Kirthi and Daniel S. Putler (1997) "Incorporating Demographic Variables in Brand Choice Models: An Indivisible Alternatives Framework", *Marketing Science*, 16 (2): 166-181.
- Kardes, Frank R., Gurumurthy Kalyanaram, Murali Chandrashekar, and Ronald J. Dornoff (1993), "Brand Retrieval, Consideration Set Composition, Consumer Choice, and the Pioneering Advantage," *Journal of Consumer Research*, 20 (June), 62-75.
- Louviere, J.J. (1981) "A Conceptual and Analytical Framework for the Analysis of Spatial and Travel Choices" *Economic Geography*. 57, 4, 304-315.
- Louviere, J.J., Hensher, D.A. and J.D. Swait (2000) *Stated Choice Methods: Analysis and Application*, Cambridge, UK: Cambridge University Press.
- Louviere J.J. and David S. Waller (2003) "A Conceptual Framework and Approach to Modelling Consumer Decision States: Final Report", unpublished report for UTS Faculty of Business, February.
- Nicosia, Francesco M. (1966) *Consumer Decision Processes*, Englewood Cliffs, NJ: Prentice Hall.
- Roberts, J.H. and J.M. Lattin (1991) "Development and Testing of a Model of Consideration Set Formation," *Journal of Marketing Research*, 28, 429-440.
- Small, K. (1987) "A discrete choice model for ordered alternatives," *Econometrica*, 55, 2, 409-424.

Figure 1: Conceptual Model of Consumer Choice Stages



Source: Louviere and Waller (2003)

Table 1: Results of Binary Logit Estimation for Category Choices – Island Holidays

	Table 1a: Visited an island in last 3 years				Table 1b: Most recent visit to an island			
Constructs	Coeff.	S.E.	Wald	P(Wald)	Coeff.	S.E.	Wald	P(Wald)
Capable – positive	0.064	0.042	2.315	0.128	0.063	0.045	1.926	0.164
Capable – negative	-0.046	0.050	0.853	0.356	-0.012	0.055	0.044	0.832
Heard about	0.089	0.015	33.259	0.000	0.030	0.018	2.781	0.097
Heard good things about	0.058	0.013	18.648	0.000	0.058	0.013	20.897	0.000
Now enough to decide now	0.102	0.012	66.656	0.000	0.077	0.011	48.108	0.000
Interested	-0.021	0.009	5.663	0.017	-0.003	0.009	0.077	0.782
Constant	0.026	0.196	0.018	0.893	-0.923	0.215	18.369	0.000

Table 2: Results of Binary Logit Estimation for Category Choices – DVD Players

	Table 2a: Have ever used a DVD player				Table 2b: Would consider DVD players			
Constructs	Coeff.	S.E.	Wald	P(Wald)	Coeff.	S.E.	Wald	P(Wald)
Capable of using	.147	.042	12.291	.000	.003	.040	.004	.950
Heard about	.043	.011	16.404	.000	.051	.011	19.834	.000
Heard good things about	.079	.010	61.854	.000	.020	.008	5.801	.017
Now enough to decide now	.062	.012	27.635	.000	-.024	.008	7.920	.005
Interested	.006	.008	.570	.450	.061	.008	64.851	.000
Constant	.873	.259	11.398	.001	-.583	.233	6.273	.017